Evaluation Scheme & Syllabus

for

Bachelor of Design (B.Des.)

I, II, III & IV Year

(For Batch 2020 Onwards)
PREFACE

Design is a profession of thinkers and visionaries, people who shape human experience of the future by learning from the past and the present. They're trained by exploration and practice to spot patterns, trends and possibilities in people’s day to day lives and gain insights from them. For these insights to be objective, meaningful and most importantly, actionable enough to evolve into ideas that improve human lives as well as the environment, a multidisciplinary field like design offers itself like a framework of effective problem solving.

The B.Des. course at UPID Noida is a 4-year full-time course in which candidates are admitted after 10+2 level examination or its equivalent as per eligibility guidelines of the AICTE/ University.

The aim of the undergraduate course is to develop skills, knowledge and attitude among the young design aspirants to become creative thinkers and problem solvers with a comprehensive value system. The value system here not only means social, moral and ethical values but also valuing our environment and the ecosystem.

The B.Des. course has three main focus areas- Product Design, User Interface and Experience Design (UI/ UX) and Visual Communication. The exposure in these areas is reinforced further through our pool of Electives which helps students to develop a broad understanding of the domain one wants to pursue as a profession. The entire curriculum has been drafted to develop competencies required as a Designer in a gradual manner that spreads across the four years.

**Creative Thinking & Problem solving** are among the fundamental skills required across diverse domains. The students begin developing these skills from the very first year through courses like- Introduction to Design and Design thinking which are then further developed in each semester through theme-based Design projects from the second year till the final year.

**Skill Development and Enhancement** is made in a chronological way with basics of communication and presentation being imparted through courses like- Creative visualization Techniques, Design Drawing, Technical Communication, Rendering and Illustration, in the first year. This is later enhanced through modules of Communication Studies in Design, Model Making and Hand Tools in second year. And further, managerial and entrepreneurial skills are developed through courses in the last two years.

**Domain and Technical Knowledge** plays a critical role and empowers a designer to conceptualise and translate ideas into reality. The students are exposed to the basics of Design in first year through courses like- Elements of Design, Principles of Design, Material Studies in Design etc. The knowledge of CAD, manufacturing and mechanics is imparted through modules on Computer Aided Design and Manufacturing, Kinetic art and Automata Design etc. in the second year. The last two years help the student to deep-dive into advance learning in these areas through core as well as the elective courses that complement the focus areas, one of them being the learning of Universal & Sustainable design.
Exposure is imperative in bringing a comprehensive perspective to a designer. The curriculum exposes the students to diverse domains associated with the design field including- Indian Art & Craft, Architectural Studies, On-field/ site visits through Design Documentation modules, Humanities & Social Studies, Environmental Sciences etc. The Industry connect is also ensured through internships that a student has to pursue in semester breaks and a final design project or thesis in the final semester where students are encouraged to do Industry-sponsored projects. In addition, the institute organises talk/lecture series, workshops, contests etc. for the students during the four year course. The end semester evaluation, also known as Jury, is done by experts from the industry to bring in the aspect of industry feedback, for majority of the courses.

With these considerations in mind, the curriculum and detailed syllabus of Bachelor’s Degree Course in Design is offered in this document with an intention to prepare graduates who can successfully render their services to the society, industry and the environment for everyone’s benefit and their personal growth through a profession that is challenging yet exciting, philosophical yet pragmatic and emotional yet technology-driven.
### EVALUATION SCHEME

#### SEMESTER I

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</table>

L/T/P: Lecture/ Tutorial/ Practical  CT: Class Test  TE: Theory Examination  PE: Practical Examination

### SEMESTER VIII

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Course code</th>
<th>Subject</th>
<th>Periods</th>
<th>Internals</th>
<th>End Semester</th>
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<td>P</td>
<td>CT</td>
<td>TA</td>
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<td>MOOCs (For B.Des. Hons Degree)*</td>
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L/T/P: Lecture/ Tutorial/ Practical  CT: Class Test  TA: Teacher Assessment  TE: Theory Examination  PE: Practical Examination
* List of MOOCs (NPTEL) Based Recommended Courses for first year B. Des. Students:

1. Developing Soft Skills and personality-Odd Semester-8 Weeks-3 Credits

2. Enhancing Soft Skills and personality-Even Semester-8 Weeks-3 Credits

* After successful completion of 160 credits, a student shall be eligible to get Under Graduate degree in Design. A student will be eligible to get Under Graduate degree with Honours only, if he/she completes additional university recommended courses only (Equivalent to 20 credits; NPTEL Courses of 4 Weeks, 8 Weeks and 12 Weeks shall be of 2, 3 and 4 Credits respectively) through MOOCs. For registration to MOOCs Courses, the students shall follow NPTEL Site http://nptel.ac.in/ as per the NPTEL policy and norms. The students can register for these courses through NPTEL directly as per the course offering in Odd/Even Semesters at NPTEL. These NPTEL courses (recommended by the University) may be cleared during the B. Des. degree program (not necessary one course in each semester). After successful completion of these MOOCs courses the students, shall, provide their successful completion NPTEL status/certificates to the University (COE) through their college of study only. The student shall be awarded Hons Degree (on successful completion of MOOCS based 20 credit) only if he/she secures 7.50 or above CGPA and passed each subject of that Degree Programme in single attempt without any grace marks.
Bachelor of Design | 1st Year (Semester I)

1. CDS 111- Introduction to Design

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 111 - Introduction to Design</th>
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</thead>
<tbody>
<tr>
<td>Course Outcome</td>
<td>To introduce the notion of design as it evolved through time; Understanding creativity &amp; its application; Develop the ability to identify problems and finding needs; Understand the Design process</td>
</tr>
</tbody>
</table>

Unit 1: Orientation
History & evolution of design, landmark discoveries & inventions, Design & its relationship with environment (art, craft, culture, society & technology), Various domains in design and design professions

Unit 2: Creative Thinking
Logical Thinking vs. Creative Thinking, Exploring creativity through various mediums, Interpreting creativity through Navrasa.

Unit 3: Problem Identification
Methods & Techniques, Observation, identification and analysis of a problem

Unit 4: Design Process
Understanding the design process, Exposure to various design terminologies, Case studies on Design process, Overview of system design

Unit 5: Design- Beyond product design
Introduction to Experience Design, Service Design, System Design etc.

References:
Don Norman; Design of Everyday Things, 2014
Don Norman; Emotional Design, Why we love (or hate) Everyday things, 2003
David Raizman; History of Modern Design, Prentice Hall, 2004
Edward de bono; Lateral Thinking, 2010
2. CDS 112- Elements of Design

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 112 – Elements of Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Outcome</td>
<td>Develop ability to explore, discover and understand the fundamentals used in design—its elements, features and principles</td>
</tr>
</tbody>
</table>

**Unit 1: Line, Dot, Shape, Texture, Space, Form, Unity/harmony, Color**

Its types and characteristics, characteristics of a shape, concepts of positive and negative space, types of shapes, visual and emotional interpretations

**Unit 2: Coloring Primer**

Primary colors and pure hues, Introduction to colors, pigment and light, additive and subtractive models. Shades of greys. Understanding warm and cold greys, Emotions and Colors Perception of colors, emotion and colors; pantone colors, colour wheel

**Unit 3: Pattern recognition and creation**

Pattern recognition, abstraction and construction. Developing patterns by repetition of points, dots, rectilinear elements, curvilinear elements, shapes, Regular and Irregular patterns. Fractals, Tessellation

**Unit 4: Gradation and texturing**

Understanding of flat surfaces. Material and process based textures, construction based textures, pigmented textures. Gradation on flat Surface

**Unit 5: Creative art development with elements of design**

Representation of elements in visual communication.

**References:**

- Samara Timothy, Design Elements, 2nd Edition: Understanding the rules and knowing when to break them, Rockport Publishers, 2014
- Wong W., Principles of Two Dimensional Design, John Wiley & Sons, 1972
- White Alex W., The Elements of Graphic Design, Allworth Press, 2011
3. CDS 113- Materials & Processes in Design- I

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 113- Materials &amp; Processes in Design- I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Outcome</td>
<td>Knowledge of where most materials come from, Ability to identify which processes are used to make a product</td>
</tr>
</tbody>
</table>

**Unit 1: Introduction to Materials**
Classification of materials, History of significant materials.

**Unit 2: Properties and Applications of materials**
Properties and Applications Wood, bamboo, cane, leather, fabric, jute, Steel, Brass, Bronze, Copper, Aluminium, Nickel, Tin, Lead, Zinc and Alloys etc.

**Unit 3: Exploration of Materials**
Exploration of materials such as fabrics, leather, wood and metals, Steel, Brass, Bronze, Copper, Aluminium, Nickel, Tin, Lead, Zinc and Alloys

**Unit 4: Conventional manufacturing Processes**
Manufacturing process introduction - Casting, Forging, lathe, drilling, milling, welding, grinding, knurling, Foundry Tools and Equipments, Metal Cutting, other industrial practices

**Unit 5: Basic hands on practices**
Primary Importance of hands-on practices in product design; working with wood, paper, fabric, leather thread, wire, Acrylic sheets, sun board, fiber board, Introduction to making material boards.

**References:**
4. CDS 114 - Communication Studies in Design- I

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 114 – Communication Studies in Design- I</th>
</tr>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Ability to gain actionable insights from day to day conversations. Conceptual, and technical skills that make for effective communication design.</td>
</tr>
</tbody>
</table>

**Unit 1: Understanding role of communication in culture**
Defining and investigating communication, Social communication, Intercultural communication, Technology and culture, Effect of culture in communication, Models of communication, Ethics

**Unit 2: Communication Theories and Application**
Communication accommodation theory, Symbolic convergence theory, Relational dialectics, Agenda setting theory, Uncertainty reduction theory, Speech codes theory, Expectancy violation theory, Rhetoric, Cultivation theory etc.

**Unit 3: Storytelling in communication**
Speech codes, Interviews, Folk stories, Advertisements, TV shows and films, creating narratives etc.

**Unit 4: Practicing different mediums of communication**
Basics of Photography, Video, verbal and written language, gestures, audio, visual art etc.

**Unit 5: Final project**
Taking a topic and developing communication ideas for a community.

**References:**
Watson, J, What is communication studies? London: Edward Arnold, 1985
5. CDS 115- Creative Visualization Techniques

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 115 – Creative Visualization Techniques</th>
</tr>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Ability to create compelling and detailed line drawings of real and imaginary objects; Develop skills of drawing and rendering from memory and imagination</td>
</tr>
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</table>

**Unit 1: Warm Up Exercises and Rapid Sketching**
Representing the observed, representing concepts - Sketching for ideation; Lines; Geometric Shapes; introduction to colour and texture

**Unit 2: Drawing Techniques**
Grid based drawing, analytical representation; Inside-out sketching; Construction Drawing

**Unit 3: Rendering and Sciography**
Studies in light and shadow of 3-dimensional form representations; pencil rendering, Representing reality Mimetic Imagery and Abstraction; Sciography

**Unit 4: Representing Imagination**
Memory and Imagination; Object representation; Nature and life Representing nature; Figure drawing gestures and movements

**Unit 5: Perspective Projection**
One point, two point and three-point Perspective

**References:**
Betty Edwards, New Drawing on the Right Side of the Brain, 2002
Dalley Terence ed., The complete guide to illustration & design, Phaidon, Oxford, 1980
T. C. Wang, Pencil Sketching, John Wiley & Sons, 1997
R. Kasprin ,Design Media – Techniques for watercolour, pen and ink, pastel and coloured markers, John Wiley & Sons, 1999
6. CDS 151- Design Drawing

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 151 – Design Drawing</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>To familiarize students with drawing tools and accessories and to give them basic knowledge of good drafting and lettering techniques; To develop comprehension and visualization of geometrical forms. To familiarize with the concept of enlarging and reducing scales.</td>
</tr>
</tbody>
</table>

Unit 1: Introduction
Importance of design drawing, Conventions and standards: ISO; Scales; Line types; Line Weights; Hatching Types; Lettering; Introduction to AutoCad

Unit 2: Projections of Points, Lines, Planes
Projection, Orthographic projections: Points, Lines, Planes (on paper & on Autocad)

Unit 3: Projection of Solids
Orthographic projections: Solids (on paper & on Autocad)

Unit 4: Sectioning & Intersection
Section of Solids, Intersection of Solids (on paper & on Autocad)

Unit 5: Axonometric views & Development of surfaces
Isometric view, Development of surfaces (on paper & on Autocad)

References:
A.J. Dhananjay, Engineering Drawing, TMH, 2008
M B Shah and B C Rana, Engineering Drawing, 2nd Ed., Pearson Education, 2009
Bachelor of Design | 1st Year (Semester II)

1. CDS 121 - Design Thinking

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 121– Design Thinking</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>To develop the ability to comprehend problems in a creative way and come with solutions in a relatively shorter time frame.</td>
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</table>

Unit 1: Design thinking process
Understanding Design thinking process and its stages, Various types of design approaches (models like double diamond, Stanford, IDEO, DeepDive, Etc), Convergent and divergent

Unit 2: Tools and techniques (Convergent)
3 “I”s (Influence, importance, imagination), ALU (advantages, limitations, unique potential), evaluation matrix etc

Unit 3: Tools and techniques (Divergent)
Brainstorming, Mind mapping, storyboarding, Point (pluses, opportunities, issues & new thinking), empathy map, group doodle, forced connections etc

Unit 4: Case studies for implementation and application
Product design, Service design, System design etc

References:
John Thackara, In the Bubble: Designing in a Complex World, The MIT Press, 2005
Bruce Hanington, Bella Martin, Universal Methods of Design: 100 Ways to Research
Vijay Kumar, 101 design methods, John Willey & sons, inc., 2013
Edward de bono, Lateral thinking, Penguin Books
Complex Problems, Develop Innovative Ideas, and Design Effective Solutions, Rockport Publishers, 2012
Donald A. Norman, Living with Complexity, MIT Press, 2010
Jeffrey Whitten and Lonnie Bentley, Systems Analysis and Design Methods, McGraw-Hill/Irwin, 2005
2. CDS 122 - Principles of Design

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 122 – Principles of Design</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Ability to create compelling colour schemes for graphic design</td>
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<td>Understanding the emotional impact of colours on people</td>
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<td>Ability to handle different types of pigments for model making and prototyping</td>
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</tbody>
</table>

**Unit 1: Principles of visual design**
Principles of design, unity/harmony, balance, alignment, hierarchy; emphasis; similarity and contrast; Gestalt laws

**Unit 2: Morphology**
Scale, proportions; Movement, repetition; Pattern, rhythm, variety

**Unit 3: Colour Psychology**
Theory of Perception of colours; Emotion, colours and psychology; Color Psychology - Study of Hues as a determinant of human behavior.

**Unit 4: Grays**
Understanding the Grayscale, gradation methods; Composition with grays, black and white

**Unit 5: Theory of Colour mixing**
The Science of Colour Theories (Light & Pigment Theories); Colour Wheel; Tints, Tones and Shades, colour charts; Colour mixing models, colour palettes

**References:**
Itten J., The art of colour: the subjective experience and objective rationale of colour, John Wiley and Sons., 1974
L. Hotzschue, Understanding Colour, VNR, 1995
3. CDS 123- Indian Art and Craft

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 123- Indian Art and Craft</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Understanding of the history of art and culture of India through crafts and paintings. Also, gaining knowledge about its evolution over the years.</td>
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</table>

Unit 1: Introduction to art and craft history in India
Art and Craft, and the Interpretation of India’s Past

Unit 2: Indian art movements
Introduction to Gandhara School of Art, Mathura School of Art etc.

Unit 3: Art and Craft in different states and GI marks
Indian art and craft mapped through different states and GI marks
(like Bidiri, Wood carving, Dhokra, Krishna shilla, Enamelling etc)

Unit 4: Indian Painting
An introduction to Indian paintings (Deccan painting, miniature paintings, etc)
Modern and contemporary painters

Unit 5: Changing Perspectives
Changing perspectives with globalization,
Field visits and report making

References:
Anil Rao, Sandhya Ketkar, The History of Indian Art, 2017
M. P. Ranjan, Aditi Ranjan, Handmade In India, 2007
10000 Years of Art, Phaidon Press, 2009
Ilay Cooper and John Gillow, Arts and Crafts of India, 1996
4. CDS 124- Physical Ergonomics

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 124- Physical Ergonomics</th>
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<tbody>
<tr>
<td><strong>Course Outcome</strong></td>
<td>To introduce ergonomics and its significance in design. To understand the impact of anatomy, anthropometry, biomechanics, physiology and the physical environment on physical activity.</td>
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</tbody>
</table>

**Unit 1: Introduction to Ergonomics**
Definitions of Ergonomics and its classification, application and overview, Concept of Man Machine Environment System

**Unit 2: Human body & its system**
Overview of the Human Body and it’s subsystems, Understanding musculoskeletal system and its function in terms of manual activities, Understanding nervous system, human sensory organs and their limitations.

**Unit 3: Anthropometry**
Understanding and applications of anthropometry; Basic anatomy, measurement system, types; static, dynamic, posture, joint, movement; Study of work posture and its impact on human performance; Physical environment and their impact on human performance

**Unit 4: Product Ergonomics**
Understanding of product ergonomics; Man, machine and Interaction

**Unit 5: Safety**
Injury prevention, safety, vibration, shock, fatigue and occupational hazard; Error handling

**References:**
Dr. Debkumar Chakraborty, Indian Anthropometric Dimensions For Ergonomic Design Practice, National Institute of Design,
J. Dul, and B. Weerdmeester, Ergonomics for beginners, a quick reference guide, Taylor & Francis, 1993
E. Grandjean, Fitting the task to the man, Taylor & Francis Ltd.1980
5. CDS 125 - Form Studies

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 125 – Form Studies</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>To understand form and its transformation; Develop ability to manipulate form for demonstration of varied expressions; Understand and develop family of forms with a common design language.</td>
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</table>

**Unit 1: Understanding of form**
Definition of form, evolution of a flat shape into a volume, Classification of form 2D & 3D, Solids (Platonic, Archimedean)

**Unit 2: Volume relationships**
Dominant, subdominant & subordinate

**Unit 3: Transformation**
Radii manipulation, Form transition (addition & subtraction)

**Unit 4: Form, Emotions & Identity**
Abstraction & expression of form, Identity experimentations with form, texture & colour, Family of forms

**Unit 5: Form explorations**
Through different materials (Like- Paper Mache, thread, Plaster of Paris, Clay etc.)

**References:**
Gaston Bachelard and Maria Jolas (Translator),The Poetics of Space, Beacon Press; Reprint edition, 1994
6. CDS 141 -Technical Communication

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 141 – Technical Communication</th>
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7. CDS 161- Rendering & Illustration

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<tr>
<th>Course Code &amp; Name</th>
<th>CDS161 – Rendering &amp; Illustration</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Ability to visualize ideas; Ability to do visual design explorations; To be able to project ideas in compelling manner from imagination to media</td>
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</table>

Unit 1: Introduction to Rendering
Types of drawing & rendering; Importance of rendering

Unit 2: Lights and its effects
Interaction with Light Highlights, shadow and reflection study of objects; Direct and indirect illumination

Unit 3: Photorealistic Visualization
Photorealistic Visualization, Rendering objects by observation, Rapid sketching techniques; Visual compositions of objects

Unit 3: Digital techniques in Rendering and Illustration
Digital sketching; Vector illustrations; Raster Illustrations; Introduction to Image processing softwares like Adobe, Corel Draw, Inkscape, GIMP; Digital Illustration Techniques Exposure and demonstration of Illustration and rendering software

Unit 4: Illustrations
Importance of text in illustrations; Story telling by illustrations; Illustrated drawings

References:
Stephen Missal, Exploring Drawing for Animation (Design Exploration Series), Thomson Delmar Learning, 2003
T. C. Wang, Pencil Sketching, John Wiley & Sons,1997
Bachelor of Design | 2nd Year (Semester III)

1. CDS 211- Architectural Studies in Design – I, Space

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 211 – Architectural Studies in Design – I, Space</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Understand the learnings from history of art and design and demonstrate in the present day context; Understand the concept of space and its relationship with human behaviour.</td>
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</table>

Unit 1: Understanding Space
Typology of Spaces, Concept of Visual and Spatial continuity & Space hierarchy, Translation from 2D drawing/ illustration to 3D space

Unit 2: Art, Architecture & Design
Relationship in Architecture and Design, Why history is important? How design evolves? Different Art & Design movements

Unit 3: Space and human behaviour
Environmental psychology, Elements of spatial quality (Ex- Colour, pattern, texture, openings etc.), Various effects in space (Ex- Cathedral Effect, Biophilia effect, Proxemics etc.)

Unit 4: Space Design overview
Basics of - Interior Design, Exhibition Design, Scenic / Stage Design etc., Case Studies

Unit 5: Space Study
Documentation of space using framework
(Ex- AEIOU framework: Activities, Environments, Interactions, Objects, Users)

References:
Bruce Hanington, Bella Martin; Universal Methods of Design, 2012
Francis D.K. Ching, Architecture, Form, Space & Order, Fourth Edition
Yatin Pandya; Elements of Spacemaking, 2013
D. A. K. Kopec; Environmental Psychology for Design, 2006
2. CDS 212- Communication Studies in Design- II

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 212 – Communication studies in Design- II</th>
</tr>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Understanding communication channels, Understanding semiotics and its cultural aspects.</td>
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</table>

**Unit 1: Information Processing**
Coding & Decoding; Sender, Channel and Receiver; Drawing as method of interaction, observation and documentation

**Unit 2: Indirect communication**
Study of relationships between Signifier, Signified and context; Denotation and Connotation; Communicating through gestures, voice, type and visuals

**Unit 3: Introduction to Semiotic Perspective**
Visual perception & semiotics; Sign: Concept and Types; Codes: Concepts, Types and Sharing; Usage of visual semiotics

**Unit 4: Semiotic Interpretations and Cultural Metaphors**
Myths- Concepts and Debates; Communication as Text / Discourse; Ideology: Link to Meaning Making; Calendrical events: understanding of festivals and rituals; Signs and their meanings in Indian cultures

**Unit 5: Introduction to Rhetoric Perspective Origin and Evolution**
Functions of Rhetoric; Key Elements of Rhetoric; Elements and analyzation of Rhetorical Presentation

**References:**
Arthaya, Seminar on Visual semantics, IDC, IIT Bombay 1992
3. CDS 213 – Model Making and Hand Tools Workshop

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 213- Model Making and Hand Tools Workshop</th>
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<tr>
<td>Course Outcome</td>
<td>Understanding and working under workshop conditions; Understanding and specific tools for different jobs; Using conventional methods for product prototyping</td>
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</table>

**Unit 1: Workshop tools & Practices**
Introduction to workshop practices, Tools; metrology; machines and workshop work ethos; importance of PPE, safety procedures; and first aid

**Unit 2: Working with plastics & Elastomers**
Working with thermoplastics and thermosets; limitations; environmental impact; advantages and disadvantages of working with plastics.

**Unit 3: Working with Ceramics and glass**
Ceramics Types and Properties, Processing and use of ceramics and glass.

**Unit 4: Working with Wood**
Woodworking joints, Carving, and finishing

**Unit 5: Working with Metal**
Working with flat products and long products of steel, aluminium copper etc sizes and availability, joining techniques

**References:**
J. Garratt, Design and Technology, Cambridge University Press, UK, 2000
R. Thompson, Manufacturing processes for design professionals, Thames & Hudson, London 2007
4. CDS 214- Computer Aided Design and Manufacturing- I

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 214- Computer Aided Design and Manufacturing- I</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Ability to create Engineering CAD ready Surface and Solid Models, Ability to conduct design iterations in CAD software</td>
</tr>
</tbody>
</table>

Unit 1: Computer as an Aid to the Designer
Role of Computer in Designing; Computer Graphics, Systems and Hardware; Graphics Standards; Different types of Geometric Modeling Software

Unit 2: Modeling and Generation of Curves and Surfaces
Geometric figures and their representation; Types of curves and surfaces; Scanning and tracing Sketches; Modeling of curves and surfaces using software; Freeform surface modelling; Generating 2D designs using computers (engraving and routing)

Unit 3: Solid Modeling
Representation of solids: wireframe, B-rep and CSG; Modeling of simple solids using software; Modeling of complex solids using software; Generation of 2D drawings from 3D models

Unit 4: 3D Modeling of Assemblies
Modeling of Machine elements; Modeling of assemblies; Modeling of moving systems; Animation

Unit 5: Computer Aided Manufacturing and Project Work
Introduction to Computer Aided Manufacturing; Project Work in Modeling of a Product

References:
Christoph M. Hoffmann, Geometric and Solid Modelling: An Introduction
Alejandro Reyes, Beginners Guide to SolidWorks, SDC Publications
5. **CDS 271- Design Documentation - I**

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 271- Design Documentation - I</th>
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<tbody>
<tr>
<td>Course outcome</td>
<td>Comprehensive understanding of the history and present state of one cottage industry/craft of Uttar Pradesh or India; Aptitude to conduct thorough field research and collect qualitative and quantitative information which may be useful for other industries and people</td>
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</tbody>
</table>

**Field study of Micro, Small Scale Industry/ NGO**

- Field study of selected Micro, Small Scale industry /NGO to understand the functioning.
- Observe the complete process and figure out areas that can be improved upon from a designer point of view.
- Work on identified areas to make it better.
- Product design and development
- Documentation, Presentation of above
- Submission of Report
6. CDS 281- Design Project – I, Simple Product Design

<table>
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<tr>
<th>Course Code &amp; Name</th>
<th>BDS 281 – Design Project – I, Simple Product Design</th>
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<tbody>
<tr>
<td>Course outcome</td>
<td>To understand the process of design and be able to find solutions to simple problems by modifying forms and functions.</td>
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</table>

Unit 1: Overview of Design Process and its ecosystem
Design Relevance: Exposure and analysis, Case studies

Unit 2: Ideation
Brainstorming; Differential Discussion; group methods to generate ideas; solitary methods to generate ideas; Lateral Thinking

Unit 3: Concept Detailing
User Journey maps, User stories, activity mapping

Unit 4: Design Project
Design and Development of Product as per the brief

References:
A. Forty; Objects of Desire, Thames & Hudson, 1995
J. de Noblet ed., Industrial Design- Reflections of a century, Thames & Hudson, 1993
Julier, G.; 20th Century, Design, Thames & Hudson, 1993
Potter, Norman; What is a Designer: Things, Places, Messages, Princeton Architectural Press, 2002
7. RVE 301- Universal Human Values

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>RVE 301- Universal Human Values &amp; Professional Ethics</th>
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<tr>
<td>As per University Curriculum</td>
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8. CDS 231- Cyber Security

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<tr>
<th>Course Code &amp; Name</th>
<th>CDS 231 –Cyber Security</th>
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<td>As per University Curriculum</td>
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Bachelor of Design | 2\textsuperscript{nd} Year (Semester IV)

1. CDS 221–Design Management - I

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<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 221–Design Management- I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Outcome</td>
<td>Understanding of why people buy things, Ability to offer relevant products which people need, Awareness about Design Rights and their enforcement by law</td>
</tr>
</tbody>
</table>

**Unit 1: Design Management (scope for research)**
Introduction of DM, Design Manager and its roles, objectives of DM, Pillars of Design management, Strategy & supply chain techniques, Roles of design in supply chain, impact of design on business performance, Scope for Research and Development in Design Management

**Unit 2: An introduction to Consumer psychology**
Definition and understanding of consumer, consumer needs, Identification of problems and user needs and Driving Factors; Emotional Design, Analysis of an existing problem in a given context, Social Ethics and Concerns

**Unit 3: Market Study**
Definition of market, consumer, buyer; Consumer Vs Buyer, Consumer Groups, Buyer Groups, Market Trends, Market Gaps

**Unit 4: Business Communication**
Explaining Ideas through briefs, detailed briefs and concept notes, Informal and Formal Business Communication

**Unit 5: Project management**
Managing projects, project organisation, project factor, project breakdown structure, project planning and phasing, project risk, project management tools

**References:**
Brigitte Borja De Mozota, Design Management: Using Design to Build Brand Value and Corporate Innovation, Allworth Press, 2004
Kenneth B Khan, Product Planning Essentials, M E Sharpe Inc, 2011
2. CDS 222- Kinetic Art and Automata Design

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 222- Kinetic Art and Automata Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Outcome</td>
<td>Taking inspiration from art, nature, human or animal and developing mechanical designs</td>
</tr>
</tbody>
</table>

Unit 1: History of Kinetic Art and Automata
History and development of kinetic Art & automata, Art Tradition to Modern, Interactive Art and Artistic, Optical Art, Visual Perception, Creation Bicycle Wheel, Kinetic Construction (Standing Wave) (1920) Arc of Petals (1941), Moving folk toys, etc.

Unit 2: Kinematics of Particles and Rigid Bodies
Kinematics of particles and rigid bodies; System of particles, Translation; Fixed; Axis rotational; General plane motion; rectilinear motion; curvilinear motion; Relative and constrained motion; Space curvilinear motion; etc.

Unit 3: Kinetics of Particles and Rigid Bodies
Kinetics of Particles and Rigid Bodies; Force, Work and Energy; Impulse and Momentum; Impact problems; Work energy; Power; Impulse-momentum and Associated conservation principles

Unit 4: Practical Mechanics
Exploring mechanical properties of model making materials through experiments; Introduction to DIY culture; Building mechanisms using workable materials; Exploring degrees of freedom, joints and links through experiments. 4 Bar Mechanisms, Cams, Gears and followers, levers and Linkages, Cranks, wheels, springs, pulleys, ratchets and pawls mechanism

Unit 5: Bio Mechanics
Skeletal mechanisms of Animal limbs, skeletal mechanisms of human limbs, structural characteristics of Plants, structural characteristics of exoskeletons

References:
Robert Race, Making simple Automata
Rodney Frost, Creative kinetics: Making mechanical marvels in wood
J. Garratt, Design and Technology, Cambridge University Press, 1996
3. CDS 223-Computer Aided Design and Manufacturing-II

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 223- Computer Aided Design and Manufacturing-II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Outcome</td>
<td>Ability to understand the importance of CAD/CAM principles in the Product development, to model complex geometries using point cloud data and print 3D objects</td>
</tr>
</tbody>
</table>

**Unit 1: Computer Aided Manufacturing**
Details of different types of Computer Aided Manufacturing Systems, Role of CAM in today’s world, Recent Advances in CAM

**Unit 2: Geometric Modeling Using Point Cloud**
Point cloud data acquisition, Point cloud data Handling, Fitting curves and surfaces through point Clouds, Design modification of 3D models from point cloud data

**Unit 3: Rapid Prototyping (or 3D Printing)**
Introduction to Rapid Prototyping (or 3D Printing), Rapid Prototyping Data Formats, Rapid Tooling

**Unit 4: Rapid Prototyping Systems**
Liquid based RP systems, Solid based RP systems, Powder based RP systems

**Unit 5: Product Design and Manufacturing**
(using Reverse Engineering and Rapid Prototyping)
Project Work

**References:**
Jacobs, P. F., (1996), Stereolithography and other RP&M technologies, ASME.
4. CDS 261- Nature and Form

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 261— Nature and Form</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Understand and acknowledge the design in Nature; To develop an ability to take inspirations from nature and use it in designing.</td>
</tr>
</tbody>
</table>

Unit 1: Understanding Nature & its design
Evolution of form in nature; Pattern & symmetry; Fibonacci series & the golden ratio

Unit 2: Form & Metaphor
Understanding metaphors; Use of visual metaphor in product; Metamorphism

Unit 3: Nature inspired Design
Understanding Biomimicry through form, features and its application; Case studies

Unit 4: Mini project
Hands-on Project/Assignments

References:
Alan Powers, Nature in Design: The Shapes, Colors and Forms that Have Inspired Visual Invention, Conran, 2002
Mario Livio, the Golden Ratio: The Story of PHI, the World's Most Astonishing Number, Broadway, 2003
5. CDS 262– Tinkering Studio

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 262– Tinkering Studio</th>
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</thead>
<tbody>
<tr>
<td><strong>Course Outcome</strong></td>
<td>Inculcate the habit of making; Checking feasibility by proof of concept; Thinking in real world terms; Design solutions with creative thinking; Using automation tools for creativity</td>
</tr>
</tbody>
</table>

**Unit 1: Programming.**
Basic Programming Concepts in C; Programming with open hardware systems like -Arduino; Raspberry Pi etc., Processing IDE

**Unit 2: Electronics**
Introduction to electronics and components; Resistors, Capacitors, Inductors, Switches, Diodes, Transistors, Sensors and Actuators. Their Usage and applications. Integration of sensors with Programmable Logic Controllers like Arduino, Raspberry Pi

**Unit 3: Control Systems**
Open Loop & Closed Loop; Feedback Control Systems, PID Control Systems; Logical controls; On-Off Controls; Physical realization of the controllers: hydraulic, pneumatic and electronic controllers; Using programmable Logic controllers

**Unit 4: Lateral thinking**
Lateral thinking by creating puzzle/ game board’s designs and working solutions using newer or available technology/ DIY kits. Creative thinking by solutions to an existing real world problem.

**Unit 5: Tinkering Projects**
Tinkering with Soft and easily cut and moldable Materials; Thinking innovatively within resources

**References:**

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 291 – Design Project – II, Display &amp; Control Design</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course Outcome</strong></td>
<td>Examine and evaluate man-object relationship and its interface; Develop capability to analyse, comprehend the current display &amp; control systems.</td>
</tr>
</tbody>
</table>

**Unit 1: Orientation**
Need of Display & Control systems, Role of human senses, Components of Display & Control systems (Ex- input channels, response mechanisms, gratification models, action – reward etc.)

**Unit 2: Interaction Design**

**Unit 3: Ergonomics Overview**
Human Factors – Physical & Cognitive ergonomics; Visual hierarchy & structure of information; Display & Controls composition through – color, placement, orientation etc.

**Unit 4: Design Project**
As per Design brief

**References:**
- Jeffrey Anshel, Visual Ergonomics Handbook, Taylor & Francis group, 2005
- Bruce Hanington, Bella Martin; Universal Methods of Design, 2012
- Dix, Alan J.; Finlay, Janet E.; Abowd, Gregory D.; Beale, Russell; Human-Computer Interaction, Pearson Education; 2 edition, 1998
- Nielson, Jackob; Usability Engineering; Morgan Kaufmann, 1993
### 7. CDS 241 – Environmental Science

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 241 – Environmental Science</th>
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<td>As per University Curriculum</td>
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1. CDS 311- Creative Narration

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<tr>
<th>Course Code &amp; Name</th>
<th>CDS 311– Creative Narration</th>
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<tr>
<td>Course Outcome</td>
<td>Ability to comprehend and draft user stories, Ability to document user experience in a retainable form.</td>
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</tbody>
</table>

**Unit 1: Story**
Story, narrative and meaning making, metaphors

**Unit 2: Objective**
Premise and problem statement, Context

**Unit 3: Protagonist**
Characters and personas, examples of Don Quixote, Karna

**Unit 4: Chain of Events**
Plot and Scenarios

**Unit 5: Dynamics**
Relationship between problems, need and conflict, rationalization of need, rationalization of conflict, Action and Resolution

**References:**
Mike Korolenko and Bruce Wolcott, Storytelling and Design: Media Literacy for the Digital Age, Pearson Learning Solutions, 2005
Marie-Laure Ryan (editor), Narrative across Media: The Languages of Storytelling, University of Nebraska Press, 2004
Kristin M. Langellier and Eric E. Peterson, Storytelling in Daily Life: Performing Narrative, Temple University Press, 2004
2. CDS 312- Humanities And Social Studies

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 312- Humanities And Social Studies</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Develop visual awareness of the present-day environment. Recognize and relate design forms to historical precedents and possible future developments, Have a greatly increased general knowledge, including source material which one can draw on for future student and development in the field of design</td>
</tr>
</tbody>
</table>

Unit 1: Artistic Creation
Complete understanding of Perception, Communication, Imagination, Expression, and Creativity for artistic creation.

Unit 2: Expression through Art & Design movements
Understand the thoughts and techniques involved in important art movements-impressionism, cubism, constructivism, surrealism, romanticism etc. Students are expected to express their ideas via Posters, Murals, Building Art, Collage, Graffiti, 3D-Installations.

Unit 3: Anthropology
Defining anthropology, Branches of anthropology- Physical anthropology, Social Anthropology, Archaeological Anthropology, Environmental Anthropology, Anthropology and Methods of Research.

Unit 4: Ethnography
Observations/Analysis; Community- Based Ethnographic Research; Activity Theory; Empathy in Design; Value Sensitive Design; Historical development of fieldwork; relations between field methods and dominant theoretical orientations; varieties of fieldwork at present; the implications; Ethnographic research design as a continuous process; the formulation of research problems.

Unit 5: Introductory Sociology & Psychology
Sociology as a Science of Human Society: Introduction:- Basic concepts (Roles, Norms, Values, Groups and Institutions), Social Structure, Culture, Perspectives (Functionalist, Conflict & Interactionist), Psychological Perspectives and Approaches

References:
Amy. E. Aniston, Graphic Design Basics (IInd Edition)
Lydia Darbyshire, Practical Graphic Design Technique
Clifford Geertz, Interpretation of Cultures
Batya Friedman and Alan Borning, Value Sensitive Design and Information Systems
Julian Murchison, Ethnography Essentials: Designing, Conducting, and Presenting Your Research
3. CDS 313- Design Management–II

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 313– Design Management–II</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Ability to communicate novel ideas to general stakeholders</td>
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</table>

Unit 1: Product Lifecycle Management
Introduction to design management, Understanding & importance of PLM, Phases of PLM, Understanding of steps of product life cycle, procurement, Process monitoring, Quality Assurance, Guarantee Statement, Warranty Statement

Unit 2: Business Development
Understanding of Business, Forecasting, importance and needs of forecasting, process of forecasting, Product Planning for the future, Disruptive Innovation; Observations, insights and the opportunities

Unit 3: Marketable Design Development and its Accounting
Design development for the market, measuring value of design, types of budget, budget planning, cost calculation for pricing structure, measuring performance.

Unit 4: Activities in Business Management
Discussion on Knowledge Management, Induction, Scale & scope of Work, Work distribution, Time management, Scheduling, Feedback, Information loops, updates, record keeping documentation.

Unit 5: Intellectual Property Rights

References:
Brigitte Borja De Mozota, Design Management: Using Design to Build Brand Value and Corporate Innovation, Allworth Press, 2004
4. CDS 314- Design Research Methodology –I

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 314– Design Research Methodology –I</th>
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<tr>
<td>Course Outcome</td>
<td>Ability to be able to understand the basics of research and techniques.</td>
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</table>

**Unit 1: Why Do We Do Research?**
Research: an integral part of your practice (basic introduction to research)

**Unit 2: Basic Techniques**
The Research Process: A Quick Glance: Deciding what to research, Planning a research study (sampling techniques and data collection), qualitative and quantitative techniques.

**Unit 3: Literature Review**
Reviewing the Literature

**Unit 4: Problem Identification**
Formulating a Research Problem by identifying scope for research

**Unit 5: Report / Paper Writing (An Introduction)**
Colloquium paper writing

**References:**
A. Hansen, Mass communication research methods. New Delhi: Log Angeles, 2009
5. CDS 315- Architectural Studies in Design–II, Connectivity and Mobility

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 315 – Architectural Studies in Design–II, Connectivity and Mobility</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>To develop an appreciation &amp; expose the students to the history and development of planning / concepts, its relevance &amp; application to modern day principles of Spatial Planning.</td>
</tr>
</tbody>
</table>

Unit 1: Connectivity
Communication channels; interpersonal communication; mass communication; Public Information systems, Internet of Things, Artificial Intelligence.

Unit 2: Movement
Modes of Transportation; Individual Movement; Mass movement; Transportation as service; Transit Systems; Commuter centric Design.

Unit 3: Planning concepts & Infrastructure
Planning concepts related to City beautiful movement, Remote Area Connectivity; Rural Transportation; Rural Road networks, Urban Connectivity; High Density Transportation; Transit Oriented Development; Public Safety, Accessible Design; Universal Design in Public Transportation.

Unit 4: Roads and traffic studies
Awareness of concepts related to various traffic problems in India, Understanding of PCU, Traffic volume, Road capacities, Road types; their sections and intersections, Traffic calming as per IRC guidelines.

Unit 5: Sustainable and Futuristic Transportation
Structure and design flaws of Public Transportation, Alternative Energy resources for transportation; Introduction of Electric Vehicles.

References:
J. Dul, and B. Weerdmeester, Ergonomics for beginners, a quick reference guide, Taylor & Francis, 1993
E. Grandjean, Fitting the task to the man, Taylor & Francis Ltd.1980
Dr. Debkumar Chakraborty, Indian Anthropometric Dimensions For Ergonomic Design Practice, National Institute of Design, 1997
Arthur B. Gallion and Simon Eisner, The Urban Pattern – City planning and Design, Van Nostrand Reinhold company
N.V.Modak, V.N.Ambedkar, Town and country planning and Housing, orient longman, 1971
IRC Guidelines
5. **CDS 351- Design Workshop**

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 351 – Design Workshop</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Application of design process and developing forms and product ideations.</td>
</tr>
</tbody>
</table>

**Unit 1: Inspiration and theme selection**
Working on taking inspiration and theme. (Theme is the larger aspect, through brainstorming the idea, we can narrow down the aspect. Taking forward one idea as inspiration and working on studying in detail about the selected inspiration.)

**Unit 2: Design boards and references**
Brainstorm on all the ideas the student is working one, developing the supporting boards. (theme board, inspiration board, material board, client board, client profile, market study, mood boards, collecting as many reference images as possible etc.)

**Unit 3: Form and concept generation**
Developing forms through the reference images and boards. The forms have to be in the form of sketches, the students can apply concepts understood through the selected inspiration.

**Unit 4: Concept exploration and development**
Developing 3D Forms from the selected form sketches, using a variety of materials like plaster of Paris, wires, paper, cardboard, clay, foam, waste material etc.

**Unit 5: Concept detailing in products and final project**
Through the forms and sketches the students can design products incorporating concepts along with studying the market; Final display of product sheets with technical product dimensions, materials, textures, working and client details.

**References:**
- Sherwin, D.Creative workshop: 80 challenges to sharpen your design skills. How Books.2013
- Fullerton, T., Swain, C., & Hoffman, S. Game design workshop: Designing, prototyping, & playtesting games. CRC Press. 2004
- Vijay Kumar, 101 design methods, John Willey & sons, inc., 2013
- Alex Milton & Paul Rodgers, product design, Laurence King Publishing, 2011
6. CDS 381- Design Project- III, User Interface Design

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 381 – Design Project- III, User Interface Design</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Understanding the UX design; Development of proficiency in user experience in software interfaces; Understanding physiological and psychological considerations in UX design</td>
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</table>

Unit 1: Context, Content & User
Understanding Context, content & User (Contextual Enquiry, Interviews, etc.) for understanding the user and his requirements. Understanding the segmentation in and need of various user groups.

Unit 2: Physio-Psychology
Physio-psychological Constraints in designing; User Experiences Research Understanding the factors that define user experience.

Unit 3: Personas
Creating Personas; quantitative and qualitative study; Understanding the representative user; Understanding Personalities; Using models and tools to create personas; typical representative tasks

Unit 4: Mapping hierarchy
Understanding the needs-hierarchy of the user; Identification and Stratification of the users need in the interface; Information and control grouping and labeling; need to self-actualise

Unit 5: Design & Optimization
Design of visual interfaces, expressive interfaces, audio interfaces; Testing and optimizing the user interfaces; personality traits.

Design of interactive systems, products for future use, Collaborative products to be used in groups, devices for rural applications and devices for use in public places

References:
7. CDS 333- Constitution of India

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 333 – Constitution of India</th>
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<td>As per University curriculum</td>
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ELECTIVES (Semester V)

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<thead>
<tr>
<th>Elective - I</th>
<th>CDS 331A- Technology for Digital Experience</th>
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<tbody>
<tr>
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<td>CDS 331B- Animation Design</td>
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<tr>
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<td>CDS 331C- Product Ergonomics &amp; Styling</td>
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<tr>
<td>Elective - II</td>
<td>CDS 332A- UI Design and Development</td>
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<tr>
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<td>CDS 332B- Graphics and Typography</td>
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<td>CDS 332C- Furniture and Interior Design</td>
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</table>
Bachelor of Design | 3rd Year (Semester VI)

1. CDS 321- Product Branding and Identity

<table>
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<tr>
<th>Course Code &amp; Name</th>
<th>CDS 321– Product Branding And Identity</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Understanding of why organizations invest in maintaining their identity, Knowledge of Branding and Identity design process</td>
</tr>
</tbody>
</table>

Unit 1: Principles of Visual Design Refresher
Understanding visual culture; Visual Theories; Visual Design; Symbolism, Time, Sound; Point of View

Unit 2: Visual Art
Visual art History; Sculpture; Artistic Styles

Unit 3: Aesthetic Experience
Modes of Aesthetic Experience; Basics of Aesthetic values; Aesthetics of Thinking and Creativity; Taste and Aesthetes; Aesthetics of Symbols and Language;

Unit 4: Visual Experience
Photography and Moving Images; Historical, Technical and Cultural Perspective; Ethical and Critical Perspective; Motion Pictures; Television and Video; Reality Shows;

Unit 5: Branding and Identity
History of branding; structure of a Brand; Brand language; Logos; Copywriting; Typeface; Brand Placement; Brand Guidelines; Structure of Identity; Visual Abstraction; Metaphors; Communication; Representativeness; Evolution;

References:
Ralph E. Wileman, Visual Communication
David Sless, Learning & Visual Communication
Friedrich O. Huck and Carl L. Fales, The Digital Evolution: Visual Communication in the electronic age
Zia-Ur-Rehman, Visual Communication an Information Theory Approach
Margaret Mark, Carol Pearson, the Hero and the Outlaw: Building Extraordinary Brands through the Power of Archetypes, McGraw Hill, 2001
2. CDS 322- Design Research Methodology –II

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 322– Design Research Methodology –II</th>
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<tr>
<td>Course Outcome</td>
<td>Ability to be able to write colloquium paper by applying the understanding of research in various areas.</td>
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</table>

- Applications of various techniques, report and colloquium paper writing.
- Informed opinion and judgment, market research,
- On various areas using Data Visualization techniques (for example Data Point, Bar, Stack, Pie, Donut, and Dot charts; Histograms) and thereby creating infographics reports on design.

References:
A. Hansen, Mass communication research methods. New Delhi: Los Angeles, 2009
3. CDS 323- Materials and Processes in Design- II

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 323– Material And Processes In Design- II</th>
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<tr>
<td>Course Outcome</td>
<td>Ability to design products which are seemingly impossible to manufacture using conventional processes</td>
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</table>

**Unit 1: Introduction to Non-conventional Manufacturing Processes**
Introduction to Non-conventional Manufacturing Processes and their classification, their role in design and industry

**Unit 2: Additive and Material Deposition Processes**
Laser Deposition, Micro-Plasma Powder Deposition, Chemical vapor Deposition, Micro Welding, Powder Casting, Metal 3D Printing, Powder Deposition 3D printing; Extruded Filament 3D printing, Clay 3D printing, Stereolithography

**Unit 3: Subtractive and Cutting Processes**
Electrochemical machining, Electro-Discharge machining, Ultrasonic Machining, Laser Beam Machining, Water jet machining, Abrasive Jet Machining, Plasma Arc machining, Water Jet Cutting, Plasma Cutting, Laser Cutting, Electro-Discharge Wire Cutting; Abrasive Jet Cutting

**Unit 4: Special Purpose Manufacturing processes**
Roto molding, Layer Compression, Sheet contouring, Friction Welding

**Unit 5: Surface Treatment Processes**
Laser Etching, Acid/Base Etching, Electrochemical Etching, Sandblast Etching, Ultraviolet Etching, Photochemical Machining, Electrochemical Polishing

**References:**
4. CDS 324- Sustainable Design

<table>
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<tr>
<th>Course Code &amp; Name</th>
<th>CDS 324- Sustainable Design</th>
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<tr>
<td>Course Outcome</td>
<td>To be able to understand factors that have an impact on the environment and sustainability in design.</td>
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**Unit 1: Basics of Sustainable Design**
Introduction of sustainability, sustainable design principles. R’s approach, Physical, mental, spiritual, cultural, social, ethical and economic issues in designing for sustainability, Planet centric Design, C2C approach

**Unit 2: Impact of unsustainable practices on Environment**
Ecological footprints, ecosystem impact.

**Unit 3: Issues in design with respect to environment**
Design and social concerns.

**Unit 4: Sustainable Design & innovation**
Frugal Design, Design for Environment/Eco design, Design for sustainability, Design from Waste, Eco innovation, system-wide product/service strategies

**Unit 5: Lean Manufacturing**
About Lean manufacturing and its principles, Tools & Techniques, Understanding through Success stories – Toyota, Nike, Intel etc.

**References:**
James P. Womack, Daniel T. Jones (1996), Lean Thinking: Banish Waste and Create Wealth in Your Corporation
Jeffrey K. Liker, David Meier (2005), The Toyota Way Fieldbook, McGraw-Hill Education
### 5. CDS 391- Design Project- IV, Technically Complex Product Design

<table>
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<tr>
<th>Course Code &amp; Name</th>
<th>CDS 391- Design Project- IV, Technically Complex Product Design</th>
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<tr>
<td>Course Outcome</td>
<td>Ability to break down complex product ideas into smallest components, Ability to build functional prototypes</td>
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</table>

**Unit 1: Orientation**
Product Integration; Forward Integration; Backward integration; Top – Down Design Approach; Bottom-Up Design Approach; Reverse Engineering; Proof Of concept;

**Unit 2: Development of creative concepts**
With explorations of alternative solutions by mapping the functional requirements w.r.t. user requirements, ergonomics, functions, materials and processes.

**Unit 3: Design Project**
As per brief

**References:**
Steven Marjieh, Reverse Engineering Foundations: Product Design ,2018
Mike Baxter, Product Design, 1995
6. CDS 343- Essence of Indian Traditional Knowledge

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<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 343– Essence Of Indian Traditional Knowledge</th>
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<td>As per AICTE Curriculum</td>
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**ELECTIVES (Semester VI)**

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<tr>
<th>Elective - III</th>
<th>CDS 341A- Gamification and UX</th>
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<tr>
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<td>CDS 341B- Photography and Image Processing</td>
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<td>CDS 341C- Toy and Games Design</td>
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<tr>
<th>Elective - IV</th>
<th>CDS 342A- Usability Testing</th>
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<td>CDS 342B- Film and Documentary</td>
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<td>CDS 342C- Mobility and Vehicle Design</td>
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</table>
Bachelor of Design | 4th Year (Semester VII)

1. CDS 411- Professional Practice In Design

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS411–Professional Practice In Design</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Expose students to professional practise in design; Looking at Design from a business perspective</td>
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Unit 1: Entrepreneurship
Social Entrepreneurship, Business Entrepreneurship, Trading Entrepreneurship, Corporate Entrepreneurship, and Agricultural Entrepreneurship

Unit 2: Business Foundation
Timmons Model of Entrepreneurship, Investment Models, Startup Business Models, Business Plans, Pitch presentations, Small Business models

Unit 3: Legal aspects of business
Contracts and Agreements, Conflict Resolution, Arbitration

Unit 4: Running a Design Business
Set up of an independent design business, Hiring processes, Project Scheduling and work delegation, Cost Estimation; Billing, salaries and taxation

Unit 5: Professional Ethics
Ethics in Profession, Code of conduct

References:
Riadh Habash, Green Engineering: Innovation, Entrepreneurship and Design, 2017
Min Basadur, Michael Goldsby, Design-Centered Entrepreneurship, 2016
2. CDS 412- Universal Design

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<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 412 – Universal Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Outcome</td>
<td>Introduce the concept of Universal Design as a design approach; Exposure to accessibility standards and research techniques</td>
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</table>

Unit 1: Orientation
What is Universal Design? Its Origin and emergence, Need and its relevance today, Examples of UD.

Unit 2: Principles and Goals
Principles of Universal Design, Goals of Universal Design, Understanding above from various design spectrums- Product, building, information, service

Unit 3: Deep Dive
Universal - Inclusive - Accessible Design, Universal Design for Learning (UDL), Use of Assistive technologies, Research techniques like- AGNES (Age gain now empathy system simulation suit), Current ecosystem, Government Initiatives & policies.

Unit 4: Accessibility Standards and Guidelines
Physical accessibility standards for Barrier free environment, Web accessibility, WAI (Web Accessibility Initiative), World Wide Web Consortium (W3C)

Unit 5: Mini Project
As per brief

References:
Edward Steinfeld and Jordana L. Maisel, Universal Design – Creating Inclusive Environments, 2012
Bruce Hanington, Bella Martin; Universal Methods of Design, 2012
James Holmes-Seidle , Barrier-Free Design, 1996
CPWD, Guidelines and space standards for Barrier free built environment for Disabled and Elderly Persons, 1998
3. **CDS 413- Packaging Design**

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 413– PACKAGING DESIGN</th>
</tr>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Design packaging with consideration to various factors like branding, budget, target audience etc., Understanding connections between packaging, branding and the target audience.</td>
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</table>

**Unit 1: Introduction**
Introduction to different kinds of packaging material; Studying about requirements of different products; Exposure of products, services and packaging in stores and similar environments

**Unit 2: Case studies**
Studying a variety of packaging case studies for different brands, materials used; studying the sustainability aspect; understanding the feasibility; Deconstructing and studying packaging of different brands (2-5 brands can be taken in consideration); Elaborating the study on any of the selected brands.

**Unit 3: Project selection**
Selection of product for packaging development; Researching about the current packaging available; constraints and positive aspects; understanding, target audience, budget, branding

**Unit 4: Project development**
Developing a packaging for the selected product; Incorporating improvements that can be worked upon after the research work.

**Unit 5: Final packaging and its branding**
Working on the branding aspect of the packaging that has been developed.

**References:**
Marianne R. Klimchuk, Sandra A. Krasovec, Packaging Essentials: 100 Design Principles for Creating Packages (Design Essentials), Rockport Publishers; 1 edition, June 1, 2010
Marianne R. Klimchuk, Sandra A. Krasovec, Packaging Design: Successful Product Branding from Concept to Shelf, John Wiley & Sons, 2006
Paul Jackson, Structural Packaging: Design your own Boxes and 3D Forms (Paper engineering for designers and students), Laurence King Publishing, 2012
Peng Chong (Editor), Interactive Packaging Design, Design Media Publishing Ltd, 2018
Pentawards (Editor), The Package Design Book 2 (VARIA), TASCHEN; Mul edition, 2013
Tony Ibbotson, Peng Chong, Eco Packaging Now , Images Publishing Dist Ac, 2016
4. **CDS 471- Industrial Training**

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 471 – Industrial Training</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Attain hands-on experience on a live-project</td>
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</table>

Students would avail the opportunity to work with Design Firm/ Studios/ Industry under their guidance for a period of 6-8 weeks. The students are required to make a presentation of work done, submit a report and a letter/ certificate of their training.

5. **CDS 472- Design Documentation- II**

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<tr>
<th>Course Code &amp; Name</th>
<th>CDS 472- Design Documentation- II</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Exposure to site-specific study and their relevance; Documentation of Site visits and analysis, Ability to identify intervention area and come up with design solution</td>
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**Unit 1: Introduction**
Introduction to Site specific study; Studying about various sites like museums, historical sites, market places, villages etc.; understanding aspects to be covered and documentation details; compilation etc.

**Unit 2: Case studies**
Studying case studies for different site-specific projects already done; understanding various aspects; how the project started and its relevance etc.

**Unit 3: Project**
As per brief

**Unit 4: Site Visit**
The students will be visiting site as per brief conducting a study and document the same

**Unit 5: Final presentation**
Students are expected to present their site specific study and design solutions.

**References:**
Diana Panke, Research Design & Method Selection: Making Good Choices in the Social Sciences, 2018
Hemanta Doloi, Ray Green, Sally Donovan, Planning, Housing and Infrastructure for Smart Villages
6. CDS 481- Design Project – V, Systems Thinking in Design

<table>
<thead>
<tr>
<th>Course Code &amp; Name</th>
<th>CDS 481 – Design Project – V, Systems Thinking in Design</th>
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<tbody>
<tr>
<td><strong>Course Outcome</strong></td>
<td>Understand how to design for applications that require a whole lot of variations and adaptability; Ability to come up with solutions that are sustainable, cross disciplinary and consider multiple perspectives.</td>
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</table>

**Unit 1: Orientation**
Design thinking & System thinking, System thinking in Design, Understanding Systems and its typology

**Unit 2: Theories and approaches**
The fifth discipline approach, Role of Organizational Ergonomics etc.

**Unit 3: Design Project**
As per Design brief

**References:**
John Thackara, In the bubble: Designing in a complex world, MIT Press, 2005
Donald. A. Norman, Living with complexity, MIT Press, 2010
Bruce Hanington, Bella Martin; Universal Methods of Design, 2012

**ELECTIVES (Semester VII)**

<table>
<thead>
<tr>
<th>Elective - V</th>
<th>CDS 431A- Omni-channel experience design</th>
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<tr>
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<td>CDS 431B- Image, Text and sound</td>
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<td>CDS 431C- Display and Space Design</td>
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Bachelor of Design | 4th Year (Semester VIII)

1. CDS 499- Design Degree Project

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<tr>
<th>Course Code &amp; Name</th>
<th>CDS499–Design Degree Project</th>
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<tbody>
<tr>
<td>Course Outcome</td>
<td>Ability to apply and demonstrate all the skills and knowledge acquired in the previous semesters to solve a design problem</td>
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Students in this semester would take sponsored /self-sponsored full-time Design projects. The project can be taken as per interest area of student or Industry project.

The project can be sponsored by industry or organisations and even self-sponsored.